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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/771,292

02/05/2004

Soo Kil Kim

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05/20/2005

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EXAMINER

NGUYEN, HA T

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary

Application No.

10/771,292

Applicant(s)

KIM ET AL.

Examiner

Ha T. Nguyen

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-31 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 21-31 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>050504</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 21-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the limitation "depositing a first metal layer" and "depositing a second metal layer" in lines 3 and 10, it is not clear where they are deposited on .

Claims 22-31 variously depend from claim 21, they are rejected for the same reason.

Claim Rejections - 35 USC, § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(a) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 21-25 and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (USPN 6008065, hereinafter "Lee") in view of Mikkola et al (EP 1005078, hereinafter "Mikkola").

Referring to Figs. 6-10 and related text, Lee discloses [Re claim 21] a method for fabricating a liquid crystal display device comprising: forming a first metal layer 22 on a glass

substrate 20; depositing a second metal layer ; patterning the first metal layer and the second metal layer to form a gate line 100 and a gate electrode (see Figs. 6-7) ; forming a gate insulating film 26 on an entire surface including the gate line; forming a semiconductor layer 28 on the gate electrode; forming a second metal layer on the entire surface including the semiconductor layer; patterning the second metal layer to form a data line crossing the gate line and source/drain electrodes on the semiconductor layer (see Figs. 6 and 9); and forming a pixel electrode 36 connected with the drain electrode, on a passivation film 34 formed on the entire surface including the data line (See col. 4, line 55- col. 5, line 56). But it fails to disclose expressly the use of seed layer and depositing metal layer using an electric plating method. However, the missing limitations are well known in the art because Mikkola discloses these features (See paragraphs 11, 20-21). A person of ordinary skill is motivated to modify Lee with Mikkola to obtain metal layer of high quality at a lower cost.

Mikkola also discloses [Re claims 22 and 28] wherein the electric plating method including the steps of: arranging the substrate provided with the first and second metal seed layers in a tub containing an electrolytic solution and applying a negative potential to the substrate to remove a metal oxide film on surfaces of the seed layer; and providing a deposition solution to the tub and applying the negative potential to the substrate to deposit a metal on the metal seed layer; wherein the deposition solution includes a metal which is the same as the metal of the metal seed layer and does not react with the electrolytic solution; [Re claim 30] wherein the metal seed layer is formed of a metal material containing metal of the metal layer (see par. 11, 15, 17, and 21); [Re claim 23] wherein the electric plating method is performed in such a manner that pH and potential of the electrolytic solution are controlled (see par. 16); [Re claim 25] wherein the electrolytic solution reduces the metal oxide film formed on the surface of the metal seed layer to metal layer (see par. 19).

[Re claim 24] Mikkola also discloses wherein the step of removing the metal oxide film and the step of depositing the metal are performed within different chambers (see pars. 17 and 20-21). The combined teaching of Lee and Mikkola fails to disclose that the two chambers are in the tub. However, this would have been obvious to a person of ordinary skills in the art to do to reduce transport time and exposure to potential contaminants.

[Re claim 29] The combined teaching of Lee and Mikkola fails to disclose the steps of forming another substrate to oppose the glass substrate and forming a liquid crystal between the two substrates. However, this is conventional practice in the art of forming liquid crystal display device to obtain device of good quality, having reduced degradation.

[Re claim 31] Lee also discloses wherein the first and second metal layers are formed of any one of Cu, Al, Cr, Mo, W, or an Al alloy (see col. 4, line 55-col. 4, line 13).

Therefore, it would have been obvious to combine Lee with Mikkola to obtain the invention as specified in claims 21-25 and 28-31.

4. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Mikkola, as applied above, and further in view of Haydu et al. (USPN 6024856, hereinafter "Haydu").

The combined teaching of Lee and Mikkola discloses substantially the limitations of claim 26, as shown above.

But it fails to disclose expressly wherein the electric plating method is performed at a temperature of about 25-100°C.

However, the missing limitation is well known in the art because Haydu discloses that conventional temperature for electroplating Cu is 20-27°C or higher (See col. 7, lines 39-56).

A person of ordinary skill is motivated to modify Lee and Mikkola with Haydu to obtain Cu with well-known and proven characteristics.

Therefore, it would have been obvious to combine Lee and Mikkola with Haydu to obtain the invention as specified in claim 26.

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Mikkola, as applied above, and further in view of Matsuda et al. (USPN 6403481, hereinafter "Matsuda").

The combined teaching of Lee and Mikkola discloses substantially the limitations of claim 27, as shown above.

But it fails to disclose expressly wherein the electric plating method is performed within the range of current of about 10-100 μ A.

However, the missing limitation is well known in the art because Matsuda discloses this feature (See col. 6, lines 39-54).

A person of ordinary skill is motivated to modify Lee and Mikkola with Matsuda to obtain plated metal having large grains.

Therefore, it would have been obvious to combine Lee and Mikkola with Matsuda to obtain the invention as specified in claim 27.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha T. Nguyen whose telephone number is (571) 272-1678. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week. The telephone number for Wednesday is (703) 560-0528.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt, can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**HANGUYEN
PRIMARY EXAMINER**

Ha Nguyen
Primary Examiner
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